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Incidental aerial Sightings of Sea Turtles In Florida Bay, Florida 1984-1985

by

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INTRODUCTION

Adult and subadult loggerhead turtles (*Caretta caretta*) inhabit Florida Bay. Adults nest at Cape Sable (Klukas, 1967; Davis and Whiting, 1977; Kushlan, 1986), and the Dry Tortugas (Williams and Dawson, 1984). Juvenile and subadult turtles appear to use the Bay as foraging habitat. Loggerhead turtles forage on a variety sponges, jellyfish, and benthic invertebrates in the deeper portions of the Bay. Historically, green turtles (*Chelonia mydas*) reportedly nested in the nearby Florida Keys (Rebel, 1974; Dodd, 1982), but rarely do so presently. However, a few loggerheads, and an occasional hawksbill (*Eretmochelys imbricata*), apparently nest in the keys (Wells and Bellmund, 1990).

Florida Bay also appears to be a developmental habitat for juvenile loggerhead, green and possibly Kemp's ridley (*Lepidochelys kempi*) turtles. These turtles feed primarily on the flora and fauna inhabiting the shallower portions of the Bay. Blue and stone crabs (and possibly penaeid shrimp) form the main ridley diet while green turtles eat predominantly turtle and manatee grasses. All of these food items are extremely sensitive to habitat degradation, and the loss of these forage items through habitat degradation would have serious negative impacts on the Florida Bay sea turtle populations.

Sea turtles, particularly juveniles and subadults, are an integral part of Florida's estuarine, bay, and lagoonal systems (Dodd, 1982). Commercial sea turtle net fisheries flourished throughout these systems from the 1850's through 1973 (True, 1884, 1887; Collins, 1887; Smith, 1896; Brice, 1898; Schroeder, 1924; Rebel, 1974; Borel, 1991; Witzell, 1994, 1995). Many commercial turtle fishermen recognized the importance of several channels in the Florida Keys that were frequently used by turtles traveling in and out of Florida Bay with the tides, and nets were set across these channels to capture the foraging turtles. Nesting female loggerheads and eggs were also harvested near the Cape Sable rookery (Davis and Whiting, 1977; Trebeau, 1981).

Sea turtle populations are stressed throughout their ranges (National Research Council, 1990), and Florida Bay may be an important developmental habitat. There has been renewed interest in Florida Bay because of its apparent decline, and the analysis of historic data sets are important when formulating habitat and sea turtle recovery and management strategies.

The purpose of this report is to summarize incidental sightings data collected during aerial mullet surveys in Florida Bay in 1984-1985, and help establish historical levels of abundance.

METHODS

The data summarized here were collected incidentally during aerial surveys designed to estimate the biomass of mullet (*Mugil* spp.) in Florida Bay (Scott et al., 1989). The large size of Florida Bay prohibited synoptic coverage of the entire bay so standardized aerial transects were established starting at Cross Key in the northeast to Long Key in the southwest, covering an area of 1,698 km^2. All transects were approximately 3 km apart and were oriented northwest to southeast using two observers in a single-engine 4-place Cessna aircraft flying 166

km/hr at 275 m altitude. All turtles observed off of standard transects were given the transect number 99. The transects sampled on a given day were randomly selected. Twenty six surveys were conducted from January 1984 through May 1985. Surveys were conducted monthly from January to September, and bi-weekly from October to May (Table 1). Two observers noted mullet concentrations, dolphins, manatees, and turtles, and relayed sightings via intercom to a third person, who recorded times and locations of the observations. An observation or sighting may consist of more than one turtle.

The turtles were not identified, but they were most probably loggerheads and greens, the most common species in southern Florida.

RESULTS

The total number of turtles observed was 62. Of the 62 turtles, 56 were sighted during the aerial transects, with an additional 6 turtles seen in transit. Sea turtles were mostly observed near the edge of the survey area (Figure 1). The average number of turtles observed per sighting was 2.3 (range = 1-16). Sea turtle densities increased progressively in transects 13 through 21 (Table 2, Figure 2), with the highest density of 0.091 turtles/nm.

Sea turtles were not recorded from the January through the August 1984 surveys, but were recorded from September 1984 through May 1985, except for November 1984 (Table 3, Figure 3). The lack of sea turtle sightings in the earlier flights may be because the objective of the surveys was to estimate mullet biomass, and flight observers during these earlier flights may not have been inclined to record incidental sightings. Therefore, zero observations during this time period, listed in Tables 1 and 3, are probably not real zeros. The month of March had the highest incidence of sea turtle observations, indicating that this concentration of turtles may be due to an annual influx of mating loggerheads near the Cape Sable and Dry Tortugas nesting rookeries.

There are no available data on the population size, distribution, seasonal abundance, and feeding ecology of the sea turtles in Florida Bay. Aerial surveys conducted by Fritts et al., (1983a,b) for 1980/81 off nearby Naples, Florida indicated a wide range of loggerhead densities, varying temporally and spatially. The statistically adjusted densities ranged from 0.92×10^{-1} turtles/km^2 (inshore/October) to 0.11 turtles/km^2 (offshore/February).

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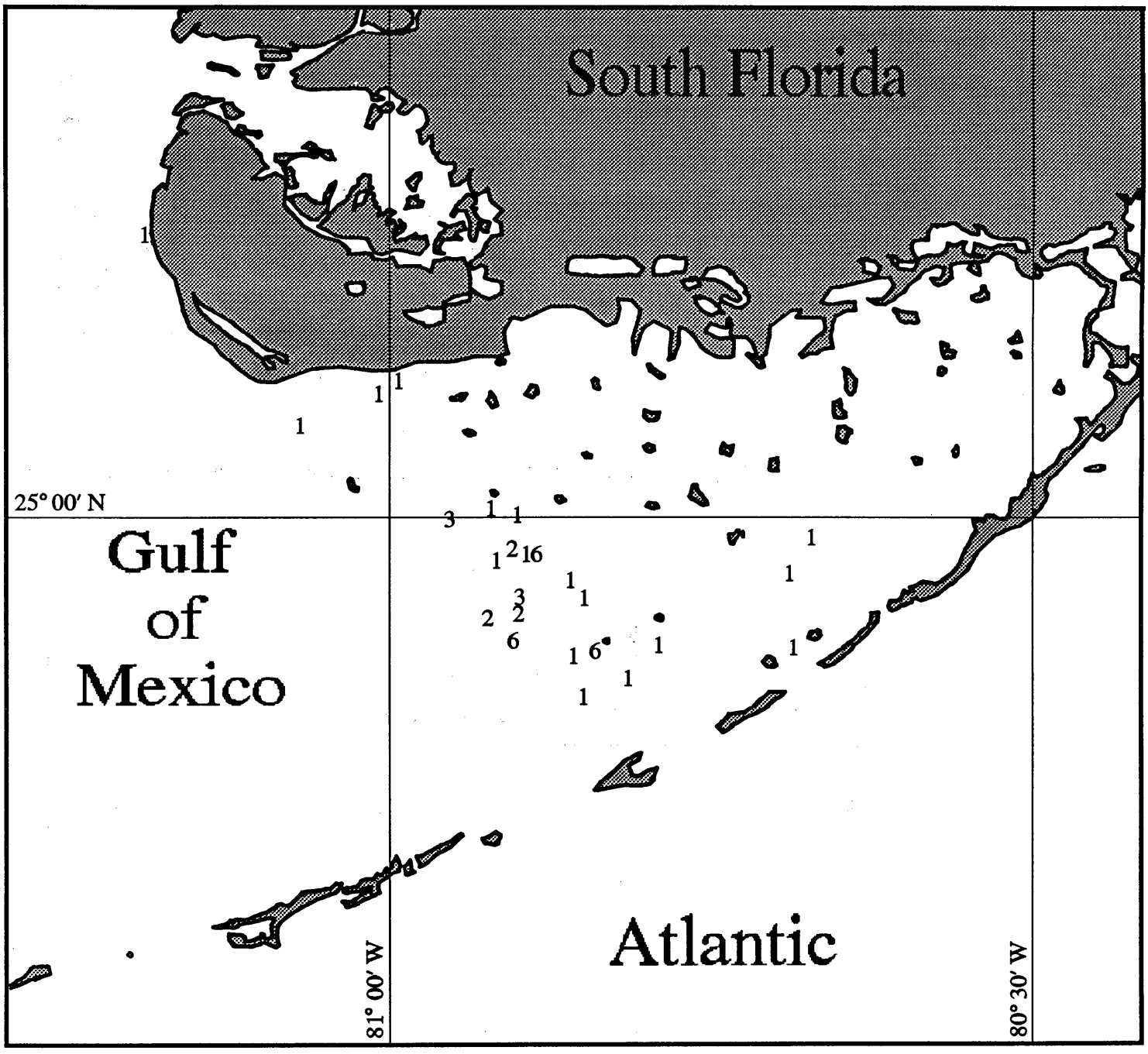

Figure 1. Locations and numbers of sea turtle sightings.

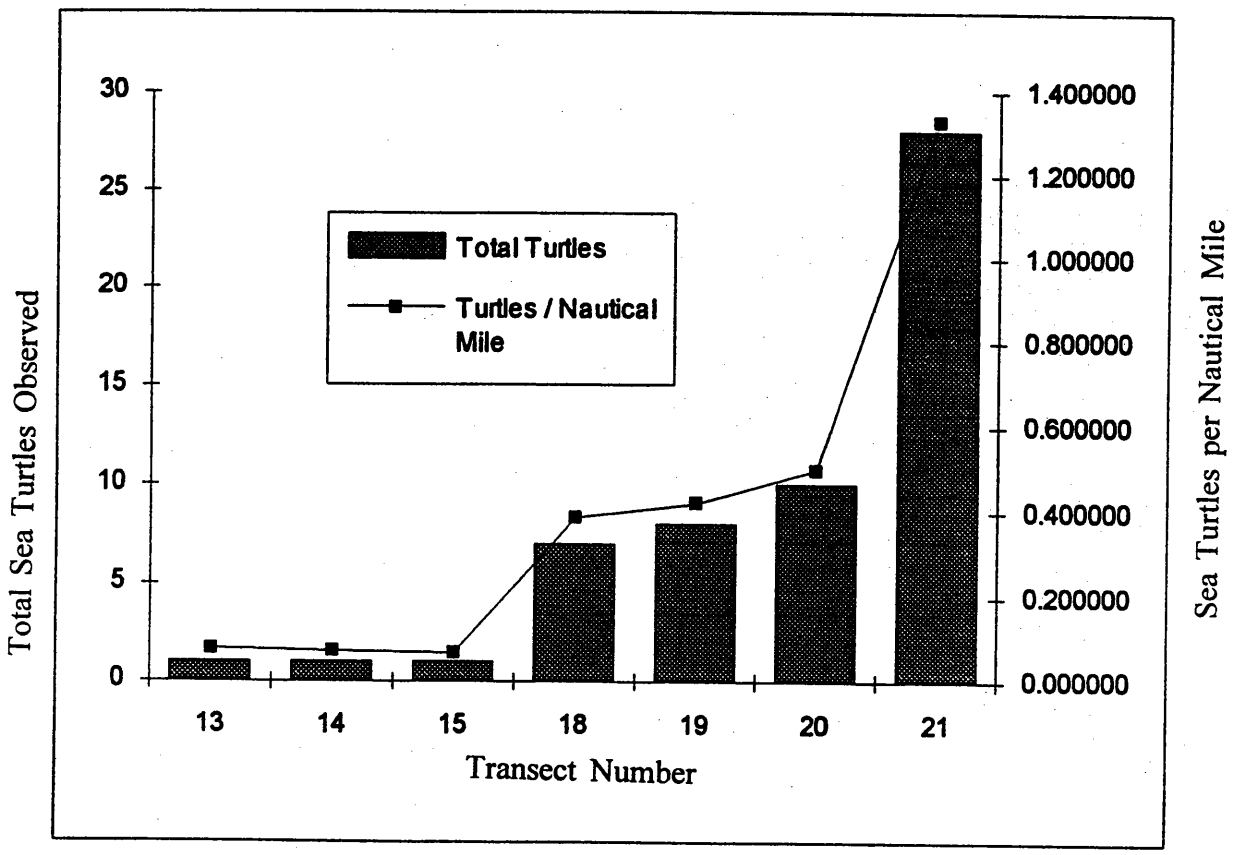

Figure 2. Sea turtles observed, by transect, per nautical mile flown.

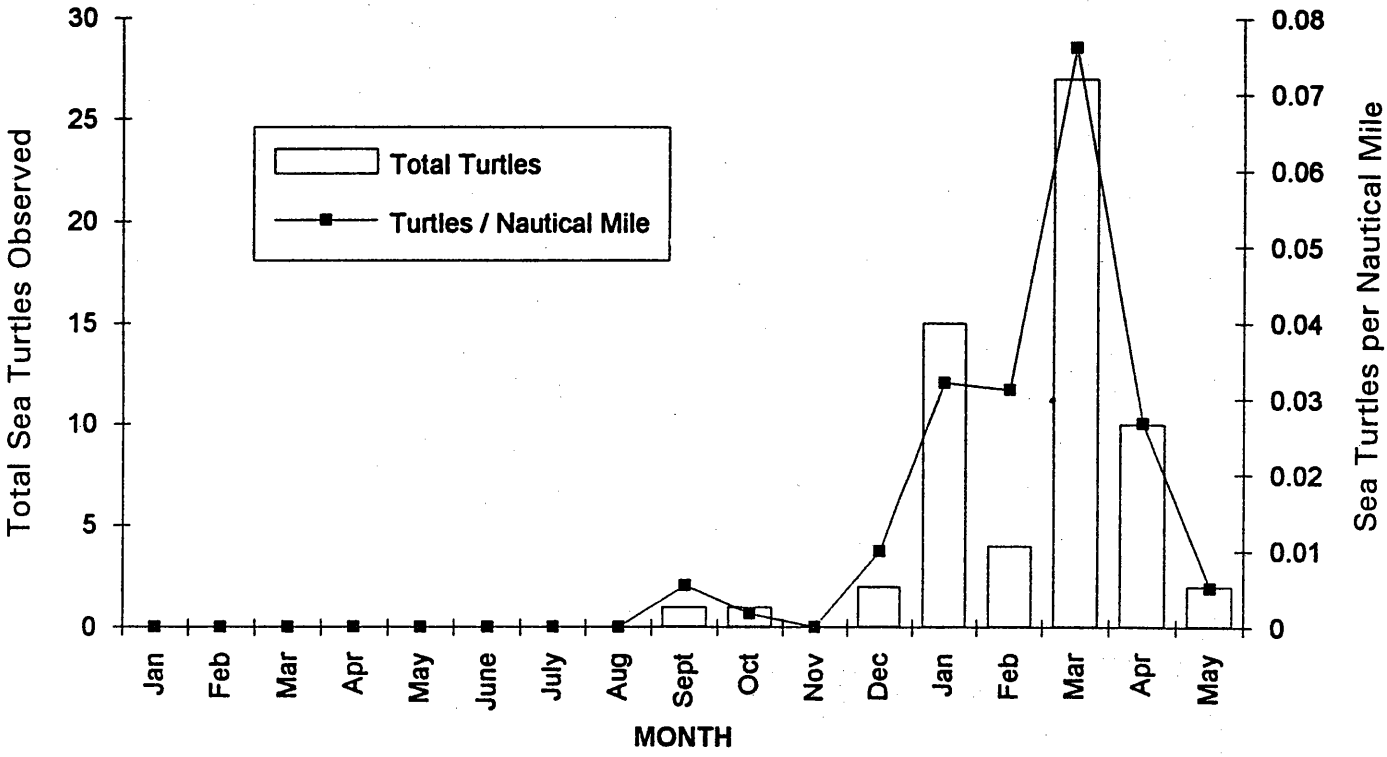

Figure 3. Sea turtles observed, by month, per nautical mile flown.

Table 1. Summary of aerial survey transects, hours flown, and numbers of sea turtle observed.

Survey #	Date	Transects Covered	Hours of Survey	# of Observations	# of Turtles
1	3-Jan-84	1,3-12	2.5	0	0
2	9-Mar-84	1-7, 9-14, 99	3.2	0	0
3	4-Apr-84	1-19 odd, 99	4.7	0	0
4	11-May-84	1-19 odd, 99	3.5	0	0
5	12-Jun-84	1-21 odd, 99	5.4	0	0
6	27-Jul-84	1-13, 17-19 odd, 99, 99	4.9	0	0
7	21-Aug-84	1-21 odd, 99, 99	5.5	0	0
8	12-Sep-84	1-19 odd, 99	5.2	1	1
9	1-Oct-84	11,13,17,19,21,99	2.1	0	0
10	3-Oct-84	5,5,7,99	1.7	0	0
11	4-Oct-84	1-21 odd, 99	5.5	1	1
12	25-Oct-84	1-21 odd, 99	4.6	0	0
13	13-Nov-84	1-21 odd	5.9	0	0
14	30-Nov-84	1-21 odd, 12, 99	6	0	0
15	14-Dec-84	1-21 odd, 99	5.6	2	2
16	4-Jan-85	1-9 odd, 99	2.8	0	0
17	11-Jan-85	1-21 odd, 99	6.3	4	9
18	25-Jan-85	1-21 odd, 99	5.2	1	6
19	15-Feb-85	8, 18-21, 99	2.8	4	4
20	1-Mar-85	1-7 odd, 8, 9-21 odd, 99, 99	5.6	5	21
21	29-Mar-85	2-20 even	4.5	3	6
22	5-Apr-85	2- 20 even, 21, 99	5.7	2	4
23	19-Apr-85	2-20 even, 99	5.2	2	6
24	3-May-85	2-20 even, 11, 99	5.3	0	0
25	17-May-85	2-20 even, 99	4	2	2
26	31-May-85	12	1.6	0	0
		Averages	4.4	1.0	2.4

Table 2. Summary of distances flown, and numbers of sea turtles observed by transect.

Transect	Total Nautical Miles Flown In Each Transect	Total Turtles In Each Transect	Turtles / Nautical Mile In Each Transect	Sightings In Each Transect	Sightings / Nautical Mile In Each Transect
13	299.2	1	0.003342	1	0.003342246
14	125.4	1	0.007974	1	0.007974482
15	270.4	1	0.003698	1	0.003698225
18	132.0	7	0.053030	3	0.022727273
19	377.6	8	0.021186	8	0.021186441
20	136.2	10	0.073421	5	0.036710720
21	306.8	28	0.091265	7	0.022816167

Table 3. Summary of distances flown, and numbers of sea turtles observed by month.

Year	Month	Nautical Miles Flown In Each Month	Total Turtles In Each Month	Turtles / Nautical Mile In Each Month	Sightings In Each Month	Sightings / Nautical Mile In Each Month	Hours Flown In Each Month	Turtles / Hour In Each Month
84	Jan	136.6	0	0	0	0	2.5	0
84	Feb	0	0	0	0	0	0	0
84	Mar	191.7	0	0	0	0	3.2	0
84	Apr	182.2	0	0	0	0	4.7	0
84	May	182.2	0	0	0	0	3.5	0
84	June	200.3	0	0	0	0	5.4	0
84	July	171.5	0	0	0	0	4.9	0
84	Aug	201	0	0	0	0	5.5	0
84	Sept	182.2	1	0.005488	1	0.005488	5.2	0.192307692
84	Oct	556.2	1	0.001798	1	0.001798	13.9	0.071942446
84	Nov	406.6	0	0	0	0	11.9	0
84	Dec	199.5	2	0.010025	2	0.010025	5.6	0.357142857
85	Jan	466.6	15	0.032147	5	0.010716	14.3	1.048951049
85	Feb	127.8	4	0.031299	4	0.031299	2.8	1.428571429
85	Mar	354.6	27	0.076142	8	0.022561	10.1	2.673267327
85	Apr	373.0	10	0.026810	4	0.010724	10.9	0.917431193
85	May	389.0	2	0.005141	2	0.005141	10.9	0.183486239